International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 03 | March - 2023 Impact Factor: 7.185 ISSN: 2582-3930

VEHICLE ACCIDENT AVOIDANCE WITH ROADADVERSE CONDITIONS MONITORING SYSTEMS

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Abstract — Accidents are the leading cause of death in emerging nations. Despite the fact that "speed kills," individuals still don't care enough to drive safely on ghat roads. The most pressing issues now are ghat road accidents and the deaths that result from them. There will be sharp turns and narrow roadways on mountain highways. Under these kinds of circumstances, a driver of a vehicle cannot see vehicles and animals travelling on the highways from the other side. This issue results in the deaths of thousands of people and animals every year. The answer to this issue is to warn the driver in the GHATs section of any approaching vehicles or animals.

In order to achieve this, "INFRARED SENSORS and LED LIGHTS" are kept on either side of the road before the curve. This way, if a vehicle approaches from one end of the curve, the sensor detects it and the LED light shines on the opposite side. Drivers can be vigilant and reduce vehicle speed by observing the LED light on/off criteria.

Keywords- Alerting system, Infrared sensor, LED, Buzzer.

I. ABSTRACT

The apparatus created here is particularly helpful for people who utilize ghat roads, especially at hairpin turns where accidents frequently occur because oncoming traffic is not visible. A hairpin-turn, so named because it resembles a hairpin, is a curve in the road with a particularly steep inner angle that forces approaching traffic to turn 180 degrees in order to proceed. This project's main goal is to warn drivers whenever the gadget detects approaching vehicles from both ends of turning points by flashing the red light at those places. A hairpin turning point simulation is included in the demo module.

The demonstration module simulates a hairpin-turning road on a wooden plank with sensors positioned across it to detect approaching vehicles from both sides. To warn the two sides of approaching drivers, we need two arrangements of flashing lights and two sensor sets.

II. INTRODUCTION

Access points into the Indian Subcontinent's hilly Western and Eastern Ghats are known as ghat highways. In India, there are numerous ghat roads that can be categorized as either one-way or two-way ghat roads. One-way traffic routes are safe when it comes to driving, however two-way traffic over ghat roads cause more accidents because of the hairpin turns at the other end of the curve. When a vehicle is moving quickly, it becomes difficult to control and runs the risk of flying off a cliff. As a result, numerous traffic safety systems are required. We advise using this vehicle accident prevention system on mountainous, winding highways to avoid these issues.

ROAD ACCIDENT IN GHAT SECTIONS:

Many drivers have accidents while driving on the roads in the Ghats section, which can lead to fatalities or major injuries. The main cause of these accidents is the way the roadways curve and bend when turning in the Ghats. One reason accidents occur in the Ghats stretch is that only one car can turn at a time at turnings. This makes it impossible for drivers to observe vehicles coming from the other lane and forces them to assume a path for turning at such a crucial segment. Turning two vehicles into each other increases the risk of accidents and makes handling the situation more challenging.

III. EXSISTING METHODOLOGIES

To navigate a hairpin bend on a hilly track, a ghat, or any other form of zero visibility turn, the following techniques are currently being used.

A. Horning your car is one of the classic techniques for navigating a hairpin bend. The drivers on either side gauge one another's distance depending on the volume of their respective horns, and during the wet season, the horn is not audible. Some folks choose not to use the actual horn. While being the most straightforward, this strategy is extremely inefficient and causes a lot of misunderstanding among the drivers.

B. Flashing headlights at night is another ineffective safety measure because it functions similarly to the car horn. Also, using this procedure in daylight is absolutely useless.

C. Convex Mirrors:

These devices are most frequently utilized today to provide a sight of any vehicle coming from the opposite end of the hairpin turn. However, these have some drawbacks, such as the requirement to maintain a clean mirror at all times, which is challenging in hilly places where it's often chilly and foggy, consequently lowering its visibility. This method has numerous drawbacks, such as the reflection of sun rays, which can divert the driver's attention. It also takes a long time for the driver to look in the mirror and react, resulting in bad judgement in turn leading to an accident Due to poor lighting at night, the other road does not appear in the mirror. Setting the mirror at a specific angle so that the cars on the other side of the road would reflect and show up as an image in the mirror also becomes more challenging. The headlight of the car on the other side of the road will strike the mirror and be reflected in the direction of the vehicle on either side if the mirror is set at a certain angle, for example. Also, during the rainy season, the observer is unable to see the reflected image of the vehicles in that mirror due to the presence of water and moisture.

D. CCTV and LCD screens:
The method uses two CCTV cameras and two LCD screens to show a live scenario that was caught by the CCTV. The initial cost of a camera is significant, and depending on how complex the CCTV camera system is, the initial outlay for installation may also go up. The CCTV camera system's limitation is that it can only monitor a small area, and because of its placement, it might not be able to record every incident.

IV. PROPOSED SYSTEM

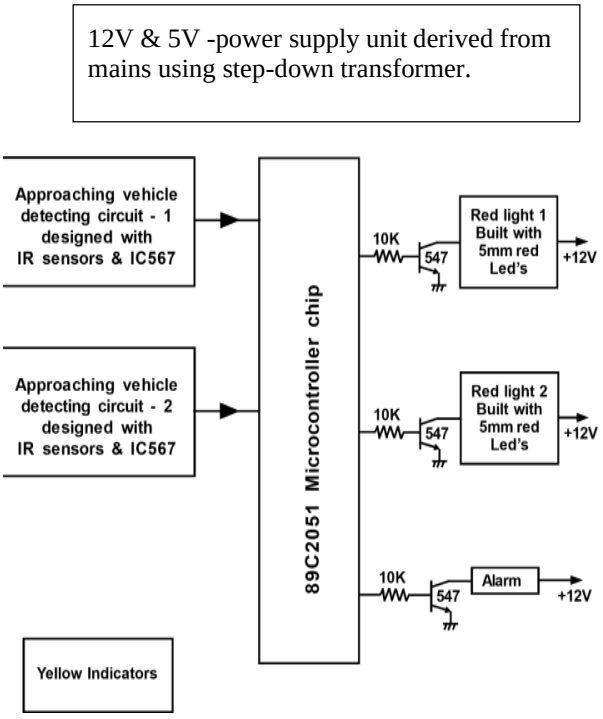
By installing a sensor on the side of the road and warning the motorist about the obstruction or vehicle in the Ghats area, we intend to solve this issue. The other side of the curve will then illuminate with light at that time. The sensor will not receive the signal if the vehicle or object is not present, and the light will not illuminate. The driver can slow down and, if necessary, stop his car as soon as the light starts to glow.

V. LITERATURE SURVEY

1. The paper titled "Sensor based accident prevention system and diminishing road accidents on sharp curves using Arduino (Ranga Sreedhar Galla, et.al. November 2017)" is proposed a system to decrease the number of accidents in curve roads. This was done by alerting the driver by means of LED light which glows when vehicle comes from the other side of the curve. The vehicle is detected by the help of Infrared sensor which was interfaced to the microcontroller.
2. The paper titled "advance road safety for Ghats road's at hairpin bend(Harshada Targe et.al., Jan-2018)" is proposed a technique consisting of two CCTV cameras and two LCD screens which displays the live scene captured from the CCTV. But this system is the initial cost price of camera is high moreover the installations of CCTV camera may also increase the initial expenditure depending upon the complexity of the CCTV camera system. The CCTV camerasystem can only monitor a limited area and CCTV camera might not catch all activity due its positions.
3. The paper titled "Collision Avoidance algorithm (Chitransh Srivastava, et. al., 2016)" is proposed a system for the implementation of collision avoidance system for hairpin.

Bends in Ghats using proximity sensors consisting of a microcontroller, IR sensors, warning LEDs. The systems have performed accurately under various conditions prioritizing the vehicles negotiating a hairpin bend on a Hilly track, Ghats etc. This simple yet effective methodology will enable the driver to have a better sense of terrain and drastically reduce road accidents in hairpin bends or other kinds of zero visibility turns. Even though this paper is that Infrared sensors can't work in dark environments and inability to use them in sunlight due to interference. Infrared sensor values normally fluctuate in variant light conditions.

VI. BLOCK DIAGRAM



VII. CAUSES AND EFFECTS:

CAUSES:

1. For increasing number of accident is overloading vehicle.
2. Topography nature of ground is another reason for spread of accident.
3. It is observed that 50% accidents have occurred negotiating the sharp bends.
4. A majority of drivers are not properlytrained.
5. Basic elements in accident on road user's vehicle and its condition along with environmental conditions.
6. Driver's pedestrian's element of surprise.

Passenger's vehicle defects road condition road design whether animal other causes are also the cause of accident.

EFFECTS:

1. Death
2. Injury
3. Vehicular damage
4. Road-damage

VIII. CONCLUSION

The purpose of this paper is to decrease the number of accidents in curve roads. This is done by alerting the driver by means of LED light and which glow when vehicles come from the other side of the curve. The vehicle is detected by the help of Infrared sensor which is interfaced to the microcontroller. By this we can save thousands of lives in the curve road.

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